

**PROTEX: A Proton-Recoil Detector for
ICF Fusion Neutrons**

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Fusion neutron diagnostics are important to Inertial Confinement Fusion (ICF) because they characterize the fusion performance and help to provide the understanding that is needed to develop higher-yield sources. Present yields in excess of 10^{13} (D,T) neutrons can be measured with a proton-recoil detector. This technique, which has not been practical with lower yields, is desirable because it provides prompt, accurate, and unambiguous results. The design that is described in this paper features a compact coaxial cylindrical geometry that optimizes sensitivity and provides in-situ independent measurement of background signals. The design also allows for simple adjustments that will make possible consistent measurement of ICF sources as their yields increase to National Ignition Facility levels. At these levels, the proton-recoil technique also will serve as the basis of more detailed studies such as spectral measurements, or perhaps even energy-resolved imaging. This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract number W-7405-ENG-48.